REMARKS

Claims 1, 11, 18, 24, 34, and 39 to clarify the invention. Claims 1-47 remain pending.

The independent claims have been amended to clarify that substantially all of an image portion that has a plurality of width pixels and a plurality of length pixels (e.g., a patch portion) is substantially simultaneously analyzed to determine defects (or mechanisms are provided for implementing such simultaneous analysis process). Simultaneous analysis of substantially all of a multi-pixel length and width image portion contrasts with the cited reference Forslund, which describes "pipelined" analysis of a row of pixels, one pixel at a time (see Affidavit from Lawrence R. Miller, MD, PhD submitted in Amendment F dated 29 July 2005).

The Examiner rejected claims 1, 3-9, 18, 22-25, 27-30, 34, 37-39, and 41-44 under 35 U.S.C. §102(b) as being anticipated by Forslund (U.S. patent 5,659,630). The Examiner has also rejected claim 10 under 35 U.S.C. §103(a) as being unpatentable over Forslund and in view of Garza et al. (US 6,081,659). Claims 11-17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Forslund and Pial et al. (US 5,357,632). Additionally, claims 20 and 35 are rejected under 35 U.S.C. §103(a) as being unpatentable over Forslund and Kober (4,181,936). Claims 21, 26, 36, and 40 are rejected under 35 U.S.C. §103(a) as being unpatentable over Forslund and Schmuter (4,999,785). Claims 31-33 and 45-47 are rejected under 35 U.S.C. §103(a) as being unpatentable over Forslund and McCubbrey (4,484,394). Claim 19 is rejected under 35 U.S.C. §103(a) as being unpatentable over Forslund. The Examiner's rejections are respectfully traversed as follows.

Claim 1 is generally directed towards an "apparatus for analyzing a plurality of image portions of at least a region of a sample." Claim 1 also requires "a plurality of processors arranged to receive and analyze the image portions" where "the processors [are] arranged to operate in parallel and [are] configurable to implement one or more algorithms from a plurality of different algorithms for analyzing the image portions selected to determine whether the corresponding regions of the sample are defective." Claim 1 also requires "a data distribution system arranged to receive image data, select at least a first processor for receiving a first image portion and not a second image portion of the image data and one or more first algorithms selected from the plurality of different algorithms, select at least a second processor for receiving the second image portion and not the first image portion of the image data and one or more second algorithms selected from the plurality of different algorithms, output the first image portion to the first processor and the second image portion to the second selected processor, and configure the first processor with the one or more first algorithms and the second processor with the one or more selected algorithms" Claim 1 also requires that "the first image portion and the

second image portion are different rectangular shaped image portions that each has a width that comprises a plurality of pixels and a length that comprises a plurality of pixels" and "wherein the first processor is then operable to implement the one or more first algorithms to analyze substantially all of the first image portion to determine whether the analyzed first image portion has a defect and the second processor is then operable to implement the one or more second algorithms to analyze substantially all of the second image portion to determine whether the analyzed second image portion has a defect."

Independent claim 11 is directed towards an "apparatus for inspecting a plurality of image portions of at least a region of a sample." Claim 11 requires "a plurality of distributors arranged to receive the image portions" and "a plurality of processors that are arranged into a plurality of subgroups that are each coupled to an associated distributor." Claim 11 also require that "each processor [is] configurable to implement one or more algorithms selected from a plurality of different algorithms for analyzing the image portions to determine whether the corresponding regions of the sample are defective, each distributor [is] configurable to select one or more algorithms selected from the plurality of different algorithms, output selected image portions to its associated subgroup of processors_whereby a different set of one or more image portions is output to each associated processor, and configure its associated processor with its selected one or more algorithms, at least two of the processors [are] arranged to analyze at least two of the image portions in parallel." Claim 11 also requires that "the image portions are different rectangular shaped image portions that each has a width that comprises a plurality of pixels and a length that comprises a plurality of pixels" and "wherein each of the at least two processors are operable to implement its selected one or more algorithms to analyze substantially *all* of each of its image portions to determine whether the analyzed each image portion has a defect."

Independent claim 18 is directed towards a method and requires "receiving data derived from the inspection in a multiprocessor system" and "the system comprising a master processor and a plurality of slave processors". Claim 18 also recites "dividing the data into groups using the master processor and sending a different data group to each one of the slave processors… wherein each slave processor is configurable to implement one or more algorithms selected from a plurality of different algorithms for analyzing substantially all its received data group to determine whether the corresponding portion of the sample is defective." Claim 18 also requires that "the data groups are different rectangular shaped image portions that each has a width that comprises a plurality of pixels and a length that comprises a plurality of pixels." Claim 24 is also a method claim and requires "outputting each image portion to a selected processor, at least some of the image portions going to different processors" where "each being configurable to implement one or more algorithms selected from a plurality of different algorithms for analyzing

the image portions to determine whether the corresponding portions of the sample are defective." Claim 24 also requires "selecting one or more algorithms from the different algorithms of each selected processor and configuring each selected processor with its selected one or more algorithms." Claim 24 also requires "analyzing substantially all of each image portion for defects within the selected processor based on the selected one or more algorithms for such selected processor to determine whether the corresponding portion of the same has a defect." Claim 24 also requires that "the image portions are different rectangular shaped image portions that each has a width that comprises a plurality of pixels and a length that comprises a plurality of pixels." Claims 34 and 39 are directed towards computer readable medium and have limitations similar to method claims 18 and 24, respectively.

The present invention includes mechanisms for parallel processing of different rectangular shaped image portions that each have a multiple pixel length and a multiple pixel width with different processors, wherein this processing includes analysis of substantially all of each rectangular image portion to determine defects. Analysis of substantially an entire rectangular shaped image portion to determine the presence of defects facilitates a significantly efficient inspection process where defects are found quickly for whole patch image portions by parallel processors.

The cited reference Forslund fails to teach or suggest mechanisms for processing different rectangular shaped image portions in different processors in order to determine whether defects are present, wherein each processor is operable to process substantially all of its image portion, in the manner claimed. In contrast, Forslund describes only pipeline image processing, where pixels are processed one at a time by each processor. Although multiple processors receive different lines of pixels, each processor processes only a single pixel at a time. This interpretation of Forlsund is fully supported by an affidavit by Lawrence R. Miller, MD, PhD, one skilled in the art, which affidavit was submitted in the previous Amendment F dated 29 July 2005.

The Examiner has cited Figure 7B and Col. 6, Lines 50-57 as teaching processing of different image portions that each have a multiple pixel length and a multiple pixel width by different processors. Although Forslund recites dividing an image into two halves that are processed by two sets of processors, it is respectfully submitted that Forslund fails to teach processing of these two halves in other than a pipelined manner. That is, Forslund merely discloses that each processor receives a line of pixels from these two halves and that only a single pixel from the received line is processed at a time, rather than each processor processing substantially all of an rectangular shaped image, in the manner claimed.

The Patents 4,174,514 to Sternberg and 4,484,349 to McCubbrey are referenced with respect to Figure 7B in Col. 6, Lines 64-65 in Forslund as describing ways to process these two images halves. These patents clearly describe pipeline systems for processing lines of pixels, rather than processing rectangular shaped images portions, in the manner claimed. In general, McCubbrey and Sternberg both relate to transforming a pixel one at a time in a pipelined manner. Although neighbor pixels may be utilized to perform transformation of this single pixel, only a single pixel in each line of pixels is processed or transformed at a time in a pipelined manner. Sternberg teaches a serial array of processors that process contiguous segments, where each processor transforms a single pixel based on neighbors of such single pixel. See Sternberg, Col. 3, Lines 15-20. McCubbrey teaches image line segments being fed into each processor. See Figures 1 and 3. Specifically, the pixels 1-5 of line 1 (see Fig. 1) are fed into pipeline 12 (see Fig. 3), while the next pixels 4-9 are fed to pipeline 14. Overlapping occurs to account for neighbors for each processed pixel. That is, pipeline 12 transforms pixels 1-4 one at a time in a pipeline based on neighbors, such as pixel 5. Besides failing to teach or suggest mechanisms for processing different rectangular shaped image portions, the cited references also fail to teach mechanisms for processing <u>substantially all</u> of each rectangular shaped image portion by a different processor in order to determine whether defects are present, in the manner claimed.

Additionally, Forslund fails to teach mechanisms for configuring different processors to process different images portions that each have a multiple pixel length and a multiple pixel width, wherein the processing involves defect detection, in the manner claimed. The sections of Forlund cited by the Examiner for teaching processing different image portions that each have a multiple pixel length and a multiple pixel width with different processors are directed towards images processing that includes transforming pixels (in a pipeline manner) into different pixel values. That is, Forslund also fails to teach or suggest mechanisms for configuring processors with different algorithms for detecting defects in relation to image portions that each have a multiple pixel length and a multiple pixel width, where each processor is operable to process substantially all of its rectangular image portion, in the manner claimed.

In sum, Forslund fails to teach or suggest apparatus or methods for dividing the image data among different processors which are configurable to use different algorithms to process substantially all of a rectangular image portion to determine defects, in the manner claimed.

It is also submitted that Forslund fails to teach processors that are configurable with different algorithms for detecting defects (or the use of such processors), in the manner claimed. In contrast, the primary reference Forslund discloses a fixed system for processing images using fixed algorithms or procedures on the processed images. Specifically, Forslund discloses fixed parallel circuits for processing different types of defects, such as shorts and open. See Figures 12

and 15 which illustrate fixed hard-wired implementations of the short and open defect circuits, respectively. In sum, Forslund fails to teach or suggest parallel processors which are *configurable* with *different* algorithms, in the manner claimed. Accordingly, Forslund also fails to teach or suggest a mechanism for *configuring* such parallel processors with a selected algorithm, in the manner claimed.

The Examiner has cited the reference Panofsky (U.S. patent 4,445,137) as a secondary reference in a previous Office Action. Although this secondary reference Panofsky does teach image processors which modify images and these processors are configurable, the feature of configurable image processors cannot be combined with the teaching of Forslund. If one were to replace the channels of Forslund with the dynamically configurable processors of Panofsky, the combination would not operate like mechanisms of the present invention. The combination would still lack a mechanism for dynamically configuring a now dynamically configurable channel to implement one or more algorithms selected from a plurality of different algorithms for <u>analyzing substantially all of each rectangular shaped image portion to thereby determine whether the corresponding region of the sample is defective</u>. Panofsky is directed towards image processing, where pixels are merely <u>transformed</u> using a particular algorithm. Thus, Panofsky fails to teach or suggest a mechanism for selecting different algorithms for analyzing the images portions <u>to determine whether corresponding regions of the sample are defective</u>. Panaofsky is also directed at merely a pipelined system for processing one pixel at a time. See Col. 4, Lines 10-18. In other words, the combination of Forslund and Panofsky would lack a teaching for configuring processors with different algorithms for analyzing different rectangular images for a defect determination purpose, in the manner claimed.

For the forgoing reasons, it is submitted that claims 1, 11, 18, 24, 34, and 39 are patentable over the cited references.

The Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 2-10, 12-17, 19-23, 25-33, 35-38, and 40-47 each depend directly from independent claims 1, 11, 18, 24, 34, or 39 and, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claims 1, 11, 18, 24, 34, and 39. Further, the dependent claims require additional elements that when considered in context of the claimed inventions further patentably distinguish the invention from the cited art. For example, claim 3 requires "determining whether the analyzed first image portion has a defect is based on the comparison between the first image portion and the first reference image portion and determining whether the analyzed second image portion has a defect is based on the comparison between the second image portion and the second reference image portion." The cited references

fail to teach utilizing configurable processors for such processing, where the multiple pixel length and width images are compared to a reference image to determine defect presence, in the manner claimed.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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